

Occupational Therapy and Brain Tumor Patients: A Necessary Pairing

An Honors Thesis (HONR 499)

by

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Abstract

The purpose of this paper is to demonstrate the beneficial impact occupational therapy can have on brain tumor patients' quality of life. The brain is the control center for vital functions of the body including speech, movement, thoughts, feelings, memory, vision, hearing, and more.

Occupational therapy is the use of assessment and treatment to develop, recover, or maintain the daily living and work skills of people with a physical, mental, or cognitive disorder. There are many cases in which brain tumors hinder or interfere with patients' daily activities. This paper presents research, facts, and statistics about brain tumors and occupational therapy.

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Process Analysis

Throughout my time at Ball State, I have found a few topics I have become passionate about. This research project connects two of those areas. One topic is my future career as an occupational therapist. While being in the Exercise Science Department, I have learned about occupational therapy, researched it, and experienced it with a five hundred hour internship at a pediatric rehab clinic. It has become a career that I look forward to reaching and see myself being very happy with in the future. The next topic I have become passionate about is brain tumor research. The summer before my freshman year, my grandfather was diagnosed with a cancerous brain tumor. Nine months after he was diagnosed, he passed away. After his passing, I wanted to learn more about the disease that took his life and what could have been done to make him more comfortable during the time he was still alive. Two months after he passed away I teamed up with the American Brain Tumor Association and made a commitment to fundraise \$1,000 and run the Chicago Marathon for brain tumor research and patient care. I have made this commitment for the past three years. The American Brain Tumor Association has taught me many things about brain tumors and the treatment for patients.

The process I took to complete this project was challenging at first, but then quickly fell into place. I struggled to find a topic that I connected with. I sat down and made a list of areas I put high focus on throughout my four years at Ball State. While there are many things I am proud of accomplishing here, the two that I found to be most important are the time I have put toward reaching my career goals of an occupational therapist, and my passion for helping others. So I guess it's safe to say the idea behind this research paper has been forming throughout the past four years.

From completing this project, I have learned even more about the field I plan to work in the future. With the research I have done about occupational therapy, and reading stories of individuals who have benefitted from these services, my passion for this career goal has grown. I have learned that this is the field I truly want to work in and will be able to go to work everyday, not feeling like it's work but something I enjoy. This project has made me even more excited to pursue further education at the University of Indianapolis, starting in August, to complete their OTD program, and get started working in a field where I know I will be serving others.

I have also spent much time researching brain tumors through other published research. I have learned about the diagnosis process, the symptoms patients experience, treatment options, and rehabilitation plans. From this research, I have learned that I want to be able to contribute the improvement of quality of life for these patients, and make a difference in their rehabilitation outcomes. When I first teamed up with the American Brain Tumor Association, I had set a personal goal to complete a marathon while raising money for an organization that had become very important to my family. When training started to get more challenging, I started to focus more on why I chose to strive to reach this goal. My reasons changed the more I ran, and then I signed up for two more marathons. It was no longer to push myself; it was to raise awareness and funds for the American Brain Tumor Association, and the hundreds of patients it would benefit. I knew if those patients could push through their treatment and change their lives in order to reach the quality of life they hoped for with their new disease, I could push myself to run a few more miles to raise funds that would benefit them. When I started running for this cause, I wanted to learn more about the disease and the effects that brain tumor patient's experience.

This process has been a large factor to my personal growth at Ball State. After struggling to pick a topic, I decided to combine the two things I became very passionate about throughout my time here, the use of occupational therapy to improve quality of life for brain tumor patients. Throughout the process of this project, I have learned to appreciate the little things in life, and not take everyday activities for granted. I have learned that some people are not as fortunate to have a healthy life, and their quality of life can be decreased due to a debilitating disease. I have learned the importance of giving back to others, and assisting others who may not be as fortunate. Occupational therapy can greatly increase a sense of independence for brain tumor patients and in turn, increase their quality of life. I have really enjoyed my time working on this project and broadening my knowledge of the topic. I also appreciate the Honors College for pushing their members to complete these projects and reflect on how it shaped their learning.

Introduction

Imagine how difficult life would be if any of your coordination, motor skills, memory, or cognitive ability was hindered by a mass in your brain. You then find out that mass is a brain tumor that could permanently affect life, as you know it. The brain is the control center for vital functions of the body including speech, movement, thoughts, feelings, memory, vision, hearing, and more. In an article from *The American Journal of Nursing* about brain tumor patients, it was stated, "Patients may develop paresis with increased deep tendon reflexes, become unable to formulate or understand speech, develop inability to read, write, calculate, or recognize shape, weight, size, or texture of objects placed in their hands. Incoordination of extremities or eye movements as well as motor or sensory convulsions can also occur" [6].

Quality of life is the standard of health, comfort, and happiness, experienced by an individual. Brain tumors can cause a major detriment to one's quality of life. However, due to the advances in science, there is a field of therapy dedicated to the quality of life. Occupational therapy is a client-centered health profession concerned with promoting health and well being through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. A brain tumor can negatively affect vital body functions that control and impact one's quality of life. Occupational therapy helps people across the lifespan participate in the areas of life that they want and need to do through therapeutic use of everyday activities or occupations and can improve the quality of life for brain tumor patients [1].

Brain Tumor Statistics

The American Cancer Society predicts that about 24,000 malignant tumors of the brain or spinal cord will be diagnosed in 2017. This does not include the benign tumors, which may still have an effect on every day occupations that relate to one's quality of life [13]. Brain tumors can

be a considerable cause of morbidity in patients and their family members or care givers. The emotional distress, financial burden, and overall changes in daily living take a toll on the patients and families' quality of life [19].

As with any medical diagnosis, there is a classification system for brain tumors. In 1956, the World Health Organization (WHO) published the first edition of the international classification of human tumors. While many editions have been published since then, The 2007 WHO Classification of Tumors of the Central Nervous System article states that its "objectives have remained the same until today: to establish a classification and grading of human tumors that is accepted and used worldwide. Without clearly defined histopathological and clinical diagnostic criteria, epidemiological studies and clinical trials could not be conducted beyond institutional and national boundaries" [7]. Today, most medical institutions and professionals use the WHO system which classifies tumors based on the cell origin and how the cell behaves, from the least aggressive (benign) to the most aggressive (malignant). Similar to other cancers stages, some brain tumors are also assigned a grade. The range is from Grade I (least malignant) to Grade IV (most malignant). These assignments indicate the rate of the growth, and depend on the tumor type. The classification and grade of an individual tumor help predict its probable behavior [12].

Brain tumors and central nervous system tumors can be classified as one of more than 120 different types. While there are a vast variety of brain tumors, there are some that are more common than others. The most common primary brain tumors are called gliomas, which originate in the glial or supportive tissue of the brain. There are six different types of glial cells that all have important functions to the nervous system, and then in turn relate to the whole body.

According to the *Society of Neuroscience*, neuroscientists used to believe that glia cells were the nervous system's main source of support, helping keep brain cell communication in working order. Researchers focused more attention on the brain's 100 billion nerve cells called neurons. Recent studies, however, suggest glial cells play a vital role in brain cell communication. It is also suggested that glial cells play an important role in the development of human intelligence [10]. About one third of all primary brain tumors and other nervous system tumors form from these glial cells.

From the six different types of glial cells, there are three that may give rise to tumors. An astrocyte will produce astrocytomas (including glioblastomas), an oligodendrocyte will produce oligodendrogliomas, and ependymomas come from ependymal cells. Some tumors may contain a mixture of these cell types; these tumors are called mixed gliomas or oligoastrocytomas. These tumor types are further classified based on their growth rate and location, giving them their grade classification. Even though they are all different in some way, they all have common characteristics. They can all occur in various parts of the brain, because all glial cells are spread throughout the whole nervous system. Symptoms of these different tumor types are similar as well. Headaches, seizures, memory loss, and changes in behavior are all common early symptoms of gliomas [3]. The symptoms mentioned, are all factors that could affect one's quality of life, leading them to the need for occupational therapy.

The cause of brain tumors is unknown. Because of this, risk factors for brain cancer are much less defined than those of other cancers. Some genetic conditions and environmental factors may play little role in the development of brain tumors but there is not a strong correlation or connection. General risk factors that may be looked at are age and gender.

According to Cancer Treatment Centers of America, brain cancers do not follow any sort of general rule. For example, certain cancers, like meningiomas, are twice as likely to develop in women. Medulloblastomas are more frequently found in males. The Cancer Treatment Center also states, "In general, the frequency of brain cancer increases with age, with more occurrences in individuals' age 65 and older. The age factor varies depending on the cell type and location of the tumor. While gliomas, specifically astrocytomas, are most common in adults, ependymomas are most common in children" [2].

Symptoms and Treatment Options

The most common symptoms associated with brain tumors include headaches, nausea and vomiting, changes in vision, speech, or hearing, problems balancing or walking, changes in mood, personality, and the ability to concentrate, problems with memory, seizures, and numbness or tingling of the arms or legs [14]. Symptoms typically emerge when part of the brain is harmed, or when the tumor presses on a nerve. The nature and severity of symptoms depend on the size and location of the tumor. For example, oligodendrogliomas occur frequently in the frontal and temporal lobes and patients show symptoms related to behavioral and cognitive changes, along with overall weakness and a decrease in motor skills [12]. Some symptoms can occur if the tumor blocks the cerebral spinal fluid that flows through or around the brain. This blockage may also cause the brain to swell due to a build up of fluid.

The symptoms of brain tumors can have a large effect on the activities of daily living and overall quality of life for individuals. The primary focus for quality of life studies of brain tumor patients is on symptoms such as fatigue; sleep disorders, and cognitive dysfunctions. However, there are many other symptoms that are taken into consideration when measuring the quality of

life for these patients. Quality of life is also different for every individual. Disease expectations and the individual's cultural context may affect his/her emotional mindset. A patient and their family members can all have different responses to the diagnosis based on value systems, and their relation to ideals, standards, anxiety, and perspective. Depending on the location and size of the tumor, patients may also experience motor deficits. Deficits in motor, visual, and linguistic skills can generate significant degrees of patient dependency [15].

A large component of one's quality of life is the ability to perform activities of daily living. With the symptoms and effects of brain tumors, the ability to perform these tasks is decreased. Activities of daily living (ADL) are routine activities that people tend to do every day without needing assistance. There are six basic ADLs: eating, bathing, dressing, toileting, walking and continence. Motor and visual deficits may cause ADLs to take more time and energy to complete than normal. They may also require assistance, leading to a decrease of independence. As mentioned earlier there are also cognitive abilities that may be hindered because of a brain tumor. These cognitive deficits may alter the relationships these patients have with important people in their lives. The combination of decreased independence, change in daily life, and negative alterations to relationships can strongly affect an individual's quality of life.

Like the classification and symptoms of brain tumors, treatment options also depend on the size and location of the tumor. There are three main types of treatment options for brain tumor patients. Surgery, radiation therapy, and chemotherapy are used independently or in combination to try to remove or lessen a brain tumor. The first form of treatment is usually surgery. It is common for patients to be awake during these surgeries. After the removal, the

patient may be asked to move their leg, say the alphabet, or tell a story. Their ability to follow these commands helps the surgeon protect important parts of the brain. Brain surgery may harm normal tissue. This damage can cause problems with thinking, seeing, or speaking. It can also cause personality changes or seizures. When these changes occur, quality of life is compromised [14]

Radiation therapy is usually the next step in the treatment process. Radiation therapy kills brain tumor cells with high-energy x-rays, gamma rays, or protons and kills the cancer cells that may remain in the area after tumor removal by surgery. Sometimes, surgery is not possible because the location of the tumor would add a large risk, in which case, radiation therapy would be the first option for that patient. This form of treatment may take place at the hospital or an outpatient clinic. A large machine aims beams of radiation at specific tumors and/or the entire brain. The treatment schedule depends on the patient's age, and the type and size of the tumor. Treatment sessions are usually 5 days a week for several weeks. Some of the side effects of radiation include fatigue, hair loss, headaches, and dry, red skin. However, the side effect that may be more serious and may require the assistance of an occupational therapist would be damage to the pituitary gland or other portions of the brain. For children, this damage could cause learning problems or slow down growth and development. In addition, radiation increases the risk of secondary tumors later in life [14].

The third type of brain tumor treatment is chemotherapy. Chemotherapy is the use of drugs to kill cancer cells. These drugs can be given during or after radiation therapy. There are two methods to administer the chemotherapy drugs. One method is by mouth or intravenously, and the other is in wafers that are put into the brain. The wafers are implants in the brain that

dissolve over time. As they dissolve, the chemotherapeutic drug is released into the brain and the goal is for it to kill the cancer cells. Chemotherapy is an aggressive treatment option that may cause harsh side effects such as, nausea, vomiting, headaches, dizziness, and extreme fatigue [14].

Occupational Therapy

According to Perdana University, the first practitioners of occupational therapy (OT) worked around 1910 during World War I. These reconstructive aides worked to rehabilitate disabled soldiers and civilian patients by addressing the needs of the soldiers who were wounded past repair. They wanted to help give the soldiers something useful to do, and help put purpose back in their lives. Occupational therapy emerged as a profession, in the United States, in 1917, when the National society for Promotion of Occupational Therapy (now known as American Occupational Therapy Association (AOTA)) was established. It was officially named as Occupational Therapy in 1920. During the 1920s, occupational therapy expanded past just helping wounded soldiers, to also assisting individuals with mental illness. At this time, the focus of OT practice was on the holistic point of view and looked beyond just medicine to find a sense of mental achievement and being productive. The field took on a more scientific approach in the 1930s when it was more closely aligned and identified with organized medicine [4].

Practitioners in the field today provide services in a wide range of community settings such as, schools, senior centers, homes, clinics, hospitals, and even homeless and women shelters [8].

Occupational therapy helps people throughout the lifespan participate in activities they want and need to do with the use of therapeutic techniques of everyday activities or occupations. Occupational therapy practitioners enable people of all ages to live life to its fullest by helping

them promote health and prevent, or live better with, injury, illness, or disability. Today, OT is an evidence-based practice that is profoundly rooted in science; however, practitioners still hold a holistic perspective. In which the focus is on adapting the environment and/or task to fit the person. It is also important that the individual is an integral part of the therapy team [1].

Occupational therapy uses the most up to date research to deliver services to improve the client's outcome. The interventions are used as part of a broad approach that considers the patient's performance skills (motor, process, social interaction); activity demands; performance patterns (habits, routines, rituals, roles); and contexts and environments. OT can benefit many different types of patients. In pediatrics, OT can be beneficial to patients having trouble with early child development, mental illness, or sensory integration and sensory processing. Throughout adulthood, patients can benefit from OT in ways of health, wellness, rehabilitation, disability, mental illness, and problems in the work place [1].

In our society, the way of daily living is ever changing and expanding. Since OT assists those with impaired skills for activities of daily living, the field grows with the times and practitioners use up to date evidence-based techniques to help patients reach their goals. There are new findings and techniques in the field to improve the rehabilitation services that OT offers. The use of gesture training has become a popular technique that practitioners use with their patients to improve language and communication [5]. This is a way of delivering a strategy for activating a system independent of the impaired system, but interacting with it in a neurophysiological way. This activation results in indirect support of functional activation patterns in damaged neural systems, rather than inhibition of damaged neural systems by competitive activity. The uses of limb movements, pantomime, or tools are all ways gesture

training can be beneficial to patients with language impairment. This technique is still fairly new and under some research. Therefore it is not completely clinically ready. However, in a study done by Nneka L. Ifejika-Jones and Anna M. Barrett, it was found that communication and oral language improved in 55% of individuals across anomic impairments. 88% of participants also showed large improvements in complex motor behaviors [5].

LSVT Loud and LSVT Big are two new techniques used in occupational therapy to improve speech clarity and volume and body movement. Mrs. Lee Silverman was the prototype patient in which this treatment was named. LSVT Loud trains patients with speech impediments to speak with clarity and volume. The treatment improves vocal amplitude by stimulating laryngeal muscles through progressive exercises. The main goal of the exercises is to speak loud. The program is most effective if the patient has one-hour sessions four times a week for one month. Patients learn how to modulate volume so their speech is better understood. According to Kelly Robbins, imaging studies show evidence of positive brain changes following LVST Loud therapy [11]. Based on the same principles of LSVT Loud, LSVT Big is a treatment used for patients with movement disorders. The programs trains people to exaggerate their movements and make bigger motions. Patients copy the OTs' movements of forward and back, side to side, turning in a circle, as well as fine motor skills. The length and time for the LSVT Big program is the same as the LSVT Loud, however the patients are required to participate in home exercises and report them back to their therapist. People treated with LSVT BIG demonstrate increased trunk rotation, better balance, longer strides, and faster walking [11]. While both of these treatments are relatively new, the research is showing beneficial results in the occupational therapy field.

Another idea that occupational therapists are implementing is the use of new technology to improve rehabilitation and quality of life for patients. OmniVR is a new virtual rehabilitation system that is beginning to make a presence in the occupational therapy field. Patients are able to interact with a virtual world while therapists track their activity by using 3D cameras and a computer software. Exercise progressions can be made as the client reaches new ability levels throughout treatment sessions. Activities such as wheelchair mobility, seated exercises, gait training, arm exercises, balance, and cognition can all be improved with the emerging technology of OmniVR [11].

While there are some new technologies being invented and used specifically for rehabilitation purposes, there are also therapeutic activities that can be applied with the use of now everyday technology, like smartphones, tablets, video games, and adaptive equipment. There are multiple apps that can be downloaded to smartphones or tablets that aide in the rehabilitation of fine motor skills, cognitive abilities, handwriting enhancements, and even memory abilities. A great example of a simple everyday app that may help patients with any neurological disability suffering from memory problems is the “Reminders” app that already comes on every iPhone and iPad.

Many OTs and patients are using video games such as Nintendo Wii to participate in “exer-gaming”, which is great for heart rate, movement, cognitive functions, as well as the psychosocial aspect. Nathan Hertz OTD, MBA, OTR/L has put this technology to use in his clinic and has found, within his patients, that motivation increased, depression went away, quality of life improved, rigidity decreased, and clients could move better when using the Wii. Technology could have exponential benefits in the realm of rehabilitation, but is not always used

to its full potential. Hertz believes that video games have a long way to go with accessibility and actual simulation, but even now the technology has a lot to offer occupational therapy clients [1].

Another area that has grown and advanced within the occupational therapy field is the use of adaptive equipment. Adaptive equipment are devices that are used to assist with completing activities of daily living. These devices can aid in areas such as bathing, dressing, grooming, toileting, and feeding. The use of adaptive equipment is important to the quality of life because it enables the patient with a disability to function independently. There is also adaptive equipment to assist individuals with communication. New and innovative ideas are always arising in this area. There are many options for adaptive equipment that occupational therapists can suggest to and teach their patients to use, in hopes of improving independence and quality of life.

Occupational therapy also uses techniques to help patients suffering from chronic pain. Over time, chronic pain leads to a sense of disempowerment, and the loss of control to engage in daily activities. Occupational therapy focuses on helping individuals participate in daily activities in adaptive ways, using a self-managing approach. The patient's goals are assessed and used to identify valued activities and the therapeutic approaches that can be beneficial.

Occupational therapists use techniques such as Neuromuscular Re-education, Muscle Tension Reduction Training, Proactive Problem Solving, and Pacing Activities to improve quality of life for chronic pain patients. Neuromuscular Re-education retrains clients to use appropriate muscle groups to avoid abnormal movement patterns and be able to participate in valued daily activities. Muscle Tension Reduction Training is based on the thought that pain is a stressor on the body and mind. Learning to relax muscles and calm the mind allows the client to feel in control of his

or her body while reducing pain levels. Proactive Problem Solving teaches clients to anticipate future problems that may arise due to their pain, and to plan ahead for when those challenges arise. Self-regulation can be hard for patients with chronic pain to understand and may cause severe flare-ups of their pain. Occupational therapists teach clients to pace their activities, such as taking breaks, changing the way an activity is done, or asking for help, as effective coping strategies. These strategies can be very beneficial to any comprehensive pain rehabilitation program [9].

Occupational therapy can be used to assist individuals throughout the whole lifespan. The population of people needing occupational therapy services can be a very large range with multiple disabilities, diagnosis, or injuries. The three main techniques occupational therapists need to consider while creating a treatment plan include thinking about the individual's activities differently, adapting their environment, and using special equipment.

Occupational Therapy and Brain Tumor Patients

This paper has discussed the symptoms, impairments and recovery time associated with brain tumors, as well as the field of occupational therapy and new evidence-based techniques and treatment plans. The utilization of occupational therapy may produce additional benefits that are not part of traditional cancer treatments. OT is often an underused field in a brain tumor patient's rehabilitation plan. As previously stated, a brain tumor may affect many of the patient's functional systems in the body, such as, motor, sensory, language, and cognition. Brain tumor patients also need treatment plans that put an emphasis on managing fatigue, anxiety, confusion, and depression. OT has the means and services to address these concerns by assisting with

activities of dialing living, energy conservation, anxiety management, pain and symptom control, and providing work related support.

According to the American Journal of Occupational Therapy, in the next twenty years, cancer diagnosis in adults older than 65 will increase. By 2030, 20% of the U.S. population will be older than 65, and about 70% of all cancer types will be diagnosed amongst this group [17]. After treatments for cancer, including brain tumors, many adults report that it is difficult to return to their previous levels of activity, which greatly hinders their quality of life [17]. During oncology rehabilitation, a team of therapists work to build strength and endurance, regain independence, reduce stress and maintain the energy to participate in daily activities [18]. The rehabilitation of a brain tumor patient is no different, and an occupational therapist should be an integral part in an oncology rehabilitation team. The techniques and skills of occupational therapists, mentioned in the previous section, match the needs and services that the characteristics of brain tumor patients would benefit from. According to the American Brain Tumor Association, occupational therapists can have a large impact on a brain tumor patient's rehabilitation. Occupational therapists consider all areas of the patient's life, and help to identify the skills that may be affected by the brain tumor [16].

The first step in any rehabilitation plan is to assess the patient's goals and valued activities. Occupational therapy practitioners are experts in assessing functional activity demands against the performance abilities of clients and identifying and addressing deficits. After a task analysis has been taken, environments should be modified to best suit the patient, and occupational therapy practitioners can then create a treatment plan to help patients re-learn skills and compensate for impairments. With a personalized treatment plan for every patient,

occupational therapists strive to help brain tumor patients reach their personal goals, improve the quality of their lives, and regain their maximal level of independence [8].

Hypothetical Patient and Treatment Plan

Allie was a 21-year-old college student, attending Ball State University. During the spring of her junior year, she was diagnosed with a glioblastoma multiforme (GBM) in the center of the frontal lobe of the brain. Her symptoms included motor weakness in her hands, headaches, some cognitive impairments, and slight visual impairments. In the middle of the summer, before her senior year, Allie had surgery to remove the tumor. Allie spent some time resting in inpatient recovery, and then worked with an outpatient occupational therapist for eight weeks. This was just the start of her long rehabilitation journey, but she was ready to return to Ball State to finish her senior year of college and earn her degree in elementary education.

While meeting with her occupational therapist, Allie and her therapist worked together to determine Allie's goals and how she would get the most benefit out of occupational therapy. The first step was to prioritize Allie's daily activities. Allie's surgery took a lot out of her and changed the way she was used to living her life. In order to improve Allie's quality of life, it was important to work to get her closer to her normal level of function, before the brain tumor. The main goals to be worked on by Allie's occupational therapy were to gain endurance needed to execute all activities of daily living, improve fine motor dexterity, and to lessen visual fatigue. Luckily, Allie was moving back into a house with three of her best friends to help her with these goals and make the transition easier.

Below are a list of Allie's goal and different exercises that were used while she was in her therapy sessions with her occupational therapist and adaptations to her environments to help her through the rehabilitation process.

Improve overall strength	Improve fine motor skills	Lessen visual fatigue	Endurance	Self-care	Lessen memory and cognition impairments	Fitting into the college lifestyle
During the first month, participating in LSVT Big therapy to improve body movement and coordination	Playing games with coins	Sit in the back of the class room	Help her understand how hard she can push herself	Practice makeup and hygiene skills on virtual tools such as the OmniVR	Make daily schedules and check things off as they are completed	Know personal limits and recognize when rest is needed
Neuromuscular re-education	Playing games with cards	Adaptive keyboard with larger keys so eyes do not strain, also to help with typing impairments due to low hand dexterity	Designate a "note-buddy" for each class to acquire notes from on days she knows she is too tired to take them and listen.	Understand different techniques in doing activities she did before impairments	Use the remind app on the iPhone as memory cues	Find a new balance between school, friends, and treatment sessions
Muscle tension reduction training	Activities handling ping pong balls	Record lectures on days she is having trouble with her vision or fatigue	Find alternatives to conserve energy for important tasks, while still staying active	Use adaptive tools such as make up brushes with larger handles	Have specific places for important objects such as keys, and school supplies	Conserve energy needed for important ADLs as well as enjoying the college
Resistance putty	Using handwriting enhancement app on the iPad	Take things slow and add more activities as treatment progresses	Decreasing the weight of the backpack that is carried to class	Use a magnifying mirror	Reduce distractions such as noise and clutter	Ask for assistance from peers, and educate them on your condition

All treatment plans are trial and error. Some patients may really benefit from a specific therapeutic activity while others may not respond well to that technique. These plans are always subject to change or adapt based on the patient's progress. The occupational therapist will take assessments, in the home and clinic, and make adjustments accordingly. Therapy sessions and home exercises also change as the patient grows and progresses. The patient starts to recognize more activities they would like to partake in or improve and then alterations are made to the rehabilitation plan based on those activities.

Conclusion

An important aspect of life is enjoying the journey and process one has to take to reach their goals. It is important to take a step back to appreciate the small common things of life. As a society, we often take the ability to do everyday activities and occupations for granted. When the symptoms of a brain tumor begin to take a toll on patients, those individuals quickly realize how important even the smallest activities of daily living are. It now becomes taxing to complete a regular day, and the patient's quality of life is greatly decreased. The evidence-based research, and original and new techniques of occupational therapy work to help diminish the feeling of decreased independence and quality of life for all of its patients. The therapeutic activities practiced in the field can be very beneficial to brain tumor patients. In conclusion, oncology rehabilitation is a growing practice and occupational therapy is an integral part in rehabilitation of brain tumor patients and their quality of life.

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